Technology for

Alaskan Transportation

Spring - Volume 17 Number 1
Alaska Transportation Technology Transfer Program

IN THIS ISSUE . . .

"Improving Alaska's quality of transportation through innovative technology."

ALASKA TRANSPORTATION TECHNOLOGY TRANSFER

This newsletter is funded by a grant from the Federal Highway Administration and the Alaska Department of Transportation and Public Facilities.

REPAIR OF ASPHALT PAVEMENTS

Ed. note: Virginia T2's newsletter, "The Virginia Eclectic," has an informative three-part series on repairing asphalt pavements, focusing on repair management, distress causes, and alternatives. Because the material applies no matter what part of the U.S. or Canada your road is in, we are reprinting the serial for you. In light of Alaska's declining dollars and frequent budget cuts, figuring out a good repair schedule becomes critical.

Preserving flexible pavement has gotten progressively more complicated for many governmental agencies because of more miles of pavement, more severe traffic, more available new materials, and less available funds. Most engineer-managers are called upon not only to select the type of repair that is the most cost-effective but also to budget their needs for an entire system for several years. Rather than deal with management of a pavement system, this three-part series will attempt to summarize the concepts of pavement management on the project basis. Even though you may not have plans to institute a pavement management system, the ideas from this series will be helpful in maintaining flexible pavement. A systematic approach to how to answer the following questions will be covered: *How should I manage my repairs? What is causing the distress and what are my repair alternatives? How can I select the best alternative?*

We will deal with the problem of managing repairs in this first part.

(continued on page 2)

Hard Hats - Who Needs Them?

Don't lose your head over false objects!

Here are some answers to questions and comments most commonly heard.

"Why all the emphasis on hard hats?"

Remember, the brain is the control center of the body. The slightest damage to any part will cause a malfunction of some area of the body, either temporarily or permanently. The skull, under normal circumstances, protects the brain, but when the possibility of brain damage from outside sources exists, additional protection is required.

"My hard hat is too hot in the summer."

Tests in hot weather have shown that the temperature inside a hard hat is 12 degrees cooler than a baseball style cap. Your head is kept cool because of the ventilation provided by air spaces between the shell and the suspension. The hat's surface reflects the heat too.

"My hard hat is too cold in winter."

Liners that come down over the ears are readily available for cold days. Hard hats must not be worn on top of everyday hats or parkas, and of course, you must not remove the suspension.

"My hard hat is too heavy and strains my neck."

(continued on page 3)

Repair of Asphalt Pavements
(continued from page 1)

How Should I Manage My Repairs?

Although it is possible for a manager to track the performance of a limited number of pavements without maintaining records, a records and management system is necessary to determine when repair is necessary for large systems. The tax dollar will be spent best if repair can be optimized with a management system so that repair is performed at the correct time - not too early and not too late.

A performance curve plotting the pavement condition against traffic or time is useful to visualize and track what is happening to a pavement and is helpful in managing pavements. The Virginia DOT uses a distress maintenance rating (DMR) to gauge the pavement condition. A DMR of 100 represents a pavement in A-1 condition. The DMR is determined from a weighted combination of various distresses such as cracking, rutting, pushing, ravelling, and patching. As illustrated in Figure 1, the condition generally deteriorates slowly at the beginning and then accelerates as the pavement ages. When a repair such as application of an overlay is performed, the DMR rebounds to its original high level, and the deterioration cycle begins again. Performance curves may be plotted from condition survey data, which is collected periodically. A curve can be developed for a section of pavement that has been rated at least two times.

Some "what if?" scenarios will be examined to see how certain decisions about when and how the repair is made affect the performance of the pavement.

What if the repair is performed too late? If the condition of the pavement is allowed to decline to point "a" on Figure 1, the restoration process may be very expensive. For instance, a simple overlay may not restore the pavement to its original structural condition; therefore, the pavement may have to be reconstructed down to the base material—a very costly procedure. This type of situation occurs most often during times of budget cuts when repair is delayed.

What if the repair is performed too early? It is easy to see from Figure 1 that premature repair results in more frequent cycles and unnecessary added cost. This situation is not found very often in pavement systems. Virginia uses a minimum threshold DMR value of 83 for interstate and 78 for primary highways to indicate when a pavement needs to be serviced.

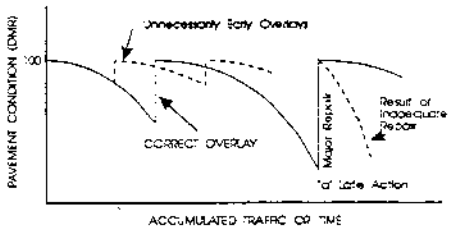


Figure 1

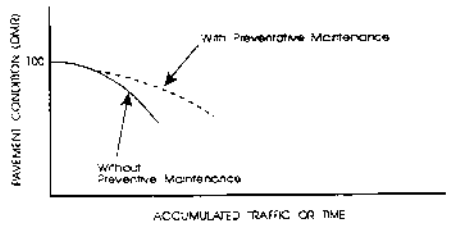


Figure 2

What if repair is inadequate? If the type of repair is insufficient to correct specific pavement problems, the future decline rate of the pavement will be higher than normal, as illustrated in Figure 1. An example would be where a simple overlay is applied over a pavement with severe alligator cracking or a wet soft base. The required future repair will be much sooner than expected, and it is possible that the service life may be very short.

Another method of lengthening the time between repairs is to perform preventive maintenance when it is necessary. Figure 2 illustrates that preventive maintenance may lessen the rate of deterioration, resulting in a longer service life. Preventive maintenance may include items such as treatments and repairs to prevent water from penetrating and weakening sensitive pavement layers.

A systematic approach of examining pavement performance gives us better control of the timeliness of repair, and it identifies the adequacy of repair. The subject that will be explored in the next Eclectic will concern methods of identifying the causes of distress and possible types of repairs.

For further information, please contact Bill Maupin at (804) 293-1948 or SCATS 745-1948.

Adapted from The Virginia Eclectic, Vol. 6, No. 4, October 1991. ♦

News & Views

Retreads Save Bucks and Environment

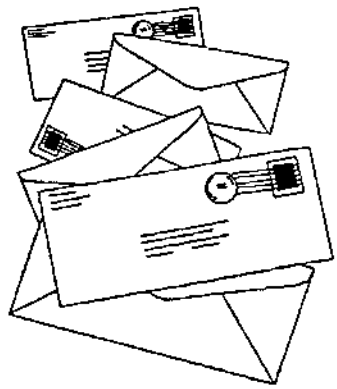
Local governments looking for ways to stretch their tax dollars have discovered what commercial truckers have known for better than two decades: retreading tires saves big dollars without sacrificing quality, dependability, or length of service. A retread can be purchased for a fraction of the price of a new tire. For example: a new bias ply grader tire costs around $240. That same tire can be retreaded for half the amount. Savings are even more substantial with radial tires.

While slashing your tire budget there are ecological benefits in using retreaded tires as well. A quality truck tire casing has the potential of up to four lives as a retread, somewhat reducing the waste disposal problems that tires can present. Since tires are basically petrochemical products, it requires 22 gallons of oil to manufacture one new truck tire. Most of that oil can be found in the casing, which is reused in retreading. Therefore, 15 gallons of oil are saved each time a truck tire is retreaded. On a national basis, over 400 million gallons of oil are saved annually by retreading. In addition to the oil savings, a potential trip to the land fill can be avoided if the casing is retreaded rather than discarded. A substantial amount of landfill space can be saved as the result of retreading.

Reprinted from the Winter 91-92 issue of, "Oklahoma Local Government News." ♦

Drop Us A Note!

Drop us a note about our newsletter. We like to hear from you. *Help us to help you!*♦



POLYMER MODIFIED EMULSIONS FOR CHIP SEALS

Oregon Department of Transportation's Research Unit is conducting a study of chip seal emulsions using asphalt containing polymers on test sections that were built in 1987 on Oregon Route 22 near Stayton in Marion County. A commonly used emulsion in the 1987 OSHD Specifications for Asphalt Materials was used as a standard for comparison. It was:

- CRS-2 cationic emulsion with a conventional asphalt.

Two other emulsions in the 1987 OSHD Specifications were also tried:

- HFE-90 anionic high-float emulsion with a conventional asphalt.
- HFE-100S anionic emulsion with Styrelf polymerized asphalt by ELF Aquitane.

Several emulsions that were rarely or never used in Oregon were also tested:

- CRS-2P cationic emulsion with latex rubber by Polysar.
- CRS-2R cationic emulsion with AC-20R polymerized asphalt by Asphalt Supply and Service.
- CRS-2D cationic emulsion with Ductilad polymerized asphalt by LBD.
- LMCRS-2H cationic "hard residue" emulsion with polymerized asphalt containing Neoprene by DuPont.
- CRS-2(P1) cationic emulsion with Chevron's CA(P)-1 polymerized asphalt containing Elvax EVA by DuPont.
- CRS-2K cationic emulsion with Chevron's CA(P)-2 polymerized asphalt containing Kraton by Shell.

(NOTE: some of the above designations are strictly Oregon DOT nomenclature.)

All seals were constructed in the conventional manner with an emulsion coat followed by a cover stone application of 3/8-inch to 1/4-inch aggregate and rolling. On one group of seals (the CRS-2 control sections and the CRS-2P, CRS-2R, HRE-100S and HFE-90 test sections) traffic was released onto the newly constructed seals. On all sections except the HFE-100S, the tires stripped most of this cover aggregate out of the wheeltracks. 1/4-inch to #10 sand was applied to these seals and they were rerolled. The exact cause of this rock loss is unknown. Perhaps the steel wheel rollers used on this project did not properly align and embed the chips in the wheeltracks of this slightly rutted road.

In contrast to the sections mentioned above, a second group of seals (the CRS-2 calibration section and CRS-2D, LMCRS-2H, CRS-2(P1), and CRS-2K test sections) were covered with sand and rolled before traffic was allowed on the seals. All of these seals retained their cover aggregate.

Polymers held the emulsion's chip retention. The polymer modified emulsions in the CRS-P, CRS-2R, and HFE-100S seals had better retention of original chips than the conventional emulsions in the CRS-2 control sections and the HFE-90 test section.

After four years of use, the following can be concluded about each emulsion.

CRS-2

This emulsion can perform well if care is used during construction. When sand was rolled into it before traffic was allowed on it, a CRS-2 seal had better than average retention of cover stone and resistance to bleeding, as shown by the performance of the calibration section. It also has slightly better than average crack sealing ability, as shown by the control sections.

CRS-2P, CRS-2R, & LMCRS-2H

These emulsions are not performing well. They had better retention of original chips than the conventional emulsions. However, their resistance to revelling and cracking is poor. Due to its poor crack sealing ability, the CRS-2P seal is the only seal that has reached the end of its useful life. This occurred in Fall 1990. The problems with the CRS-2P and CRS-2R seals may not have happened if these emulsions were blended by methods different than the ones used on this project.

HFE-90

This emulsion is not performing well. It did not retain many of its original chips and it is a poorer than average crack sealer.

HFE-100S, CRS-2D, CRS-2(P1), and CRS-2K

These emulsions are performing well. They have retained their cover aggregate and are better than average crack sealers.

The report, "Polymer Modified Chip Seal Test: Oregon Route 22," just published by the Research Unit, covers the construction and performance of these chip seals during the first two years. The results from this study will be used by the Materials and Research Section to revise the 1992 Specifications for Asphalt Materials.

These seals will be monitored by the Research Unit throughout their service life or until the reconstruction of the roadway which is scheduled for 1994. For more information, contact Keith Martin or Bo Miller, (503) 378-2318.

Reprinted from "Research Notes", Highway Division Materials & Research Section, December 1991, RSN 91-10 and reviewed by Bob McHattie, Northern Region Materials Section. ♦

Hard Hats - Who Needs Them?
(continued from page 1)

The weight of the hat should go unnoticed if the hat is properly worn and maintained. The average safety hat weights about 14 ounces while your head weighs about 13 pounds —one ounce of protection for every pound of head! It's a real bargain.

"When should I wear a hard hat?"

Check with your supervisor for the official rules for safety and protective clothing. As a general rule, however, always were a hard hat when working:

- on or adjacent to the traveled portion of the roadway (generally the right-of-way),
- while operating heavy equipment,
- where there is danger of head injury from impact, falling, or flying objects, or
- where there is danger of contact with a high voltage electrical source.

From Bulletin, Northwest Technology Transfer Center, Washington State DOT, Fall, 1988. ♦

The Alaska Transportation Technology Transfer (T2) Program is funded by the Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration.

T2 Program staff

* Sharon McLeod-Everette, SR/WA, Director, (907) 474-2475
* James L. Bennett, P.E., Engineer, (907) 474-2481
* Susan M. Earp, Clerk/Library Coordinator, (907) 474-2484

"Technology for Alaskan Transportation" is a quarterly newsletter that informs local transportation workers in government and industry of useful training materials and services. If you would like to receive our newsletter, use any of our services, or contribute to the newsletter, contact:

Alaska Transportation
Technology Transfer Program
Department of Transportation
& Public Facilities
2301 Peger Road M/S 2552
Fairbanks, Alaska 99709-5316
(907) 474-2484

"Work smarter, not harder."

ALASKA TRANSPORTATION TECHNOLOGY TRANSFER

ALASKA TRANSPORTATION TECHNOLOGY TRANSFER

Alaska Transportation Technology Transfer Program
DOT&PF - Planning
2301 Peger Road M/S 2552
Fairbanks, Alaska 99709-5316

address correction requested

BULK RATE
U.S. Postage
PAID
Fairbanks, AK
Permit No. 87

Printed by
Printing Services
University of Alaska Fairbanks

METRIFICATION IS COMING! METRIFICATION IS COMING!

by Ron Tanner

The International System of Units (SI), a modern version of the metric system of measurement, is being adopted throughout the world. Three nations have yet to convert to SI: Burma, Liberia, and the United States.

The Omnibus Trade and Competitiveness Act of 1988 declared the metric system of measurement as the preferred system of weights and measures for U.S. trade and commerce. Unlike the 1975 Metric Conversion Act, this act is not voluntary.

The Federal Highway Administration has already set up the following time table which is proceeding on schedule:

- May 1991: Develop FHWA conversion plan.
- May 1992: Initiate revision of laws and regulations that act as barriers to conversion.
- May 1994: Convert FHWA manuals, documents and publications to the metric system.
- May 1995: Data collection and reporting.
- Sept. 30, 1996: Metrification of all federal aid construction contracts.

Most highway engineering standards have no direct, obvious public impact, but two metric conversions will. One is changing the distance legends to kilometers and the other is changing speed limit signs and the advisory speed plates on warning signs to kilometers per hour.

When the Canadians went through the metrification process several years ago, they changed all of their speed limit signs over a single weekend. This "cold turkey" approach to changing the signs was made following an extensive public awareness program. There was concern that the change to the unfamiliar and larger numbers for speed limits would have an adverse effect on highway safety, but it turned out to be a "non-event." The key to acceptance in Canada was a determination to convert nation wide, "cold turkey", overnight without any dual units. This approach, if adopted in the U.S., should also save a great deal of money since additional or enlarged signs will not be required.

The speed limit conversions to metric adopted in Canada are shown below.

Present Standard	Soft Conversion	Adopted Conversion	Change
20 mph	32.18 km/h	30 km/h	-6.8%
25 mph	40.23 km/h	40 km/h	-0.6%
30 mph	48.28 km/h	50 km/h	+3.6%
35 mph	56.33 km/h	60 km/h	+6.5%
40 mph	64.37 km/h	60 km/h	-6.8%
45 mph	72.42 km/h	70 km/h	-3.3%
50 mph	80.47 km/h	80 km/h	-0.6%
55 mph	88.52 km/h	90 km/h	+1.7%
60 mph	96.56 km/h	100 km/h	+3.6%
65 mph	104.60 km/h	100 km/h	-4.4%
70 mph	112.70 km/h	110 km/h	-2.4%

The table above will also be applicable for the advisory speed plates which are used with warning signs.

Most new American car and truck speedometers already have the kilometer per hour indications, even though they are the smaller of the two displays. This should help motorists to relate more easily to the new metric speed limit and advisory speed signs. It may be necessary to make available overlay scales for the older model cars and trucks.

The mileage shown on the green and white directional signs will also have to be changed to kilometers. The existing mile post signs along our state highway system will have to be updated. The Canadians left the historic mile post markers along the Alaska Highway and supplemented them with a newly designed kilometer post to be in agreement with the distance legends on their signs.

Those who have traveled the Alaska Highway through Canada should already be familiar with most of the signing changes that will be occurring on Alaska's highways over the next several years.

Conversion Chart Into Metric Measurements

Length

If You Know	*Multiply By*	*To Get*
inches (in)	2.54	centimeters (cm)
feet (ft)	30	centimeters (cm)
yards (yd)	0.91	meters (m)
miles (mi)	1.6	kilometers (km)

Area

If You Know	*Multiply By*	*To Get*
sq. inches (in^2)	6.5	sq. centimeters (cm^2)
sq. feet (ft^2)	0.09	sq. meters (m^2)
sq. yards (yd^2)	0.8	sq. meters (m^2)
sq. miles (mi^2)	2.6	sq. kilometers (km^2)
acres (ac)		

Mass (weight)

If You Know	*Multiply By*	*To Get*
ounces (oz)	28	grams (g)
pounds (lb)	0.45	kilograms (kg)
short ton (T)		

Volume

If You Know	*Multiply By*	*To Get*
teaspoons (tsp)	5	milliliters (mL)
tablespoons (T)	15	milliliters (mL)
fluid ounces (fl oz)	20	milliliters (mL)
cups (C)	0.24	liters (L)
pints (pt)	0.47	liters (L)
quarts (qrt)	0.95	liters (L)
gallons (gal)	3.8	liters (L)
cubic feet (ft^3)		
cubic yards (yd^3)		

Temperature

If You Know		*To Get*
Fahrenheit (°F)	*subtract 32 then multiply by 5/9ths*	Celsuis (°C)

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Publications, Transportation Technology Transfer Program, DOT&PF, 2301 Peger Road, M/S 2552, Fairbanks, AK 99709-5316. For more information, you can also call (907) 474-2484.

FEEDBACK FROM THE MAC/IBM ARTICLE

In the last issue, I briefly discussed the differences between the MacIntosh and the IBM compatibles. What a response! It was great! I've always wondered if people read this column, and now I know. A few commentors agreed with me, and others disagreed. They felt I was unfair to the Mac. If I came across that way, it purely was unintentional. Macs are fine machines. As I said, though, I can only speak with comfortable authority from my experience, which is with IBM compatibles. Most of the software I regularly use is not available on the Mac, and the result is that my knowledge of the Mac is limited to the few hours I've spent playing with them.

If any of you wish to write an article describing the attributes of the Mac—or any other computing platform, for that matter—please send your article to the editor. Contributions are always welcome. Please recognize, though, that this newsletter cannot contain advertisements. And please support your beliefs with examples. Graphics, if you can provide them, are helpful.

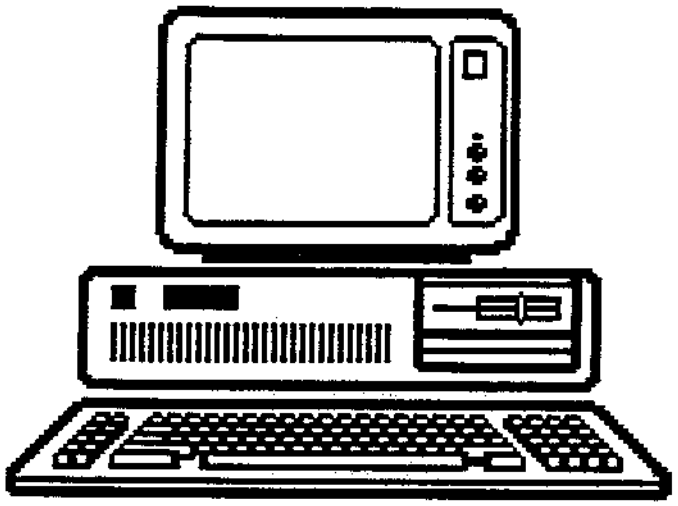
SELECTING THE RIGHT MONITOR

When you consider which monitor to purchase, consider your eyes. You may save a few dollars by selecting a less expensive monitor, but your eyes, your temperament, and possibly your health may suffer.

There are five commonly accepted standards for computer displays: Monochrome Display Adapter (MDA), Color Graphics Adapter (CGA), Enhanced Graphics Adapter (EGA), Video Graphics Array (VGA) and Super VGA. The standard monitor today is the VGA or the Super VGA monitor. The CGA monitor was never really acceptable. The EGA monitors are good, but the savings doesn't warrant buying it instead of a VGA. The price difference between a good quality monitor and a mediocre monitor is less than $150. I don't think that difference is worth the cost of having to look at an unacceptable image all day. And VGA is downward compatible with the other models.

Perhaps the most important thing to look for is a flicker-free monitor. Flicker causes eyestrain and headaches. (Glare also causes these symptoms.) You won't always notice the flicker, but it still may be great enough to cause eyestrain. I've found that by looking at the monitor at an oblique angle, you will see any significant flicker. Most of today's namebrand monitors are flicker free.

The second most important feature to look for is the quality of the image. The required image quality depends upon the use. If you use only text, then almost any VGA monitor will do. If you use AUTOCAD, then you need a very high quality monitor. The best advice I can give is to run a performance test using your applications on several monitors and select the one(s) that fit your needs.



There is concern these days about electromagnetic radiation from video monitors. While research so far is not conclusive, it is possible that electromagnetic radiation may present a health hazard. If you are concerned about electromagnetic radiation, there are several good monitors which minimize radiation. The price of these monitors is only slightly higher than monitors which do not limit radiation. Several magazines, such as "PC Magazine," "PC World," and "PC Computing," regularly review monitors. These reviews are an excellent source of information.

MATCHING THE VIDEO CARD

The video card, located inside the computer, provides the interface between the computer and the monitor. Therefore, it must be matched to the monitor. For example, a VGA card may not work

with an EGA monitor. The card you choose must also match the work you intend to do. If you work in the text mode, almost any VGA card will do. (I'm assuming your monitor is VGA.) However, if you are working in WINDOWS or AUTOCAD, you are going to want one of the new Graphic Accelerator Cards which increases the speed at which the screen is painted 4 to 10 times. VGA cards range from about $100 to over $1,000. I've found that the cards in the range of $300-$400 meet most people's demands. Only the most stringent demands, such as AUTOCAD, require the higher priced cards.

PUTTING IT ALL TOGETHER

At this point, with the information from the last several Scrambled Disks and Fried Drives, you can select a system. Now where do you buy the system? Should you buy locally or should you save money and buy from a mail order firm? If you require local support and cannot afford to have your computer down for more than a day or two, buy locally. It will cost more, but you will have that support. I've generally found that you can negotiate the price on locally purchased computers.

On the other hand, if you can afford to be without your computer for a week or so and you feel comfortable about replacing parts and loading software yourself, you should consider buying through one of the mail order firms. You can save as much as 50%. (Be careful about which firm you pick.) Some firms offer better support. Some computers are higher quality and cause fewer problems. How do you know which is which? Here's my standing policy.

* First, before I consider a computer, it must have been reviewed by "PC Magazine" or one of the other reputable computer magazines and received good marks for both the computer and after-sales support.

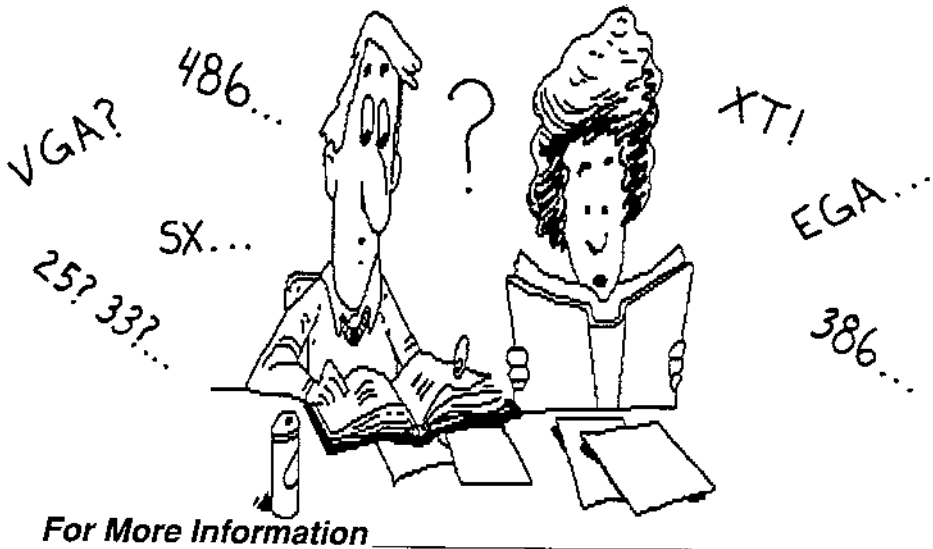
* Second, the company must have been in business for at least two years. I usually look at old issues of magazines for advertisements.

* Third, I try to find other people who have the computer I'm considering to get an idea of how well it performs.

When your computer arrives, check it thoroughly. Load your software and run it. Most failures occur within the first few weeks. Such is the nature of electronics.

AN UPDATE

Since this series began, the cost of computers has dropped dramatically. This is in part due to competition between chip manufacturers. As a result, I would strongly recommend you by a 486 machine. The cost of a 386 machine and a math coprocessor is about the same. (The 486 has the coprocessor on the chip.) Further, Intel has provided an upgrade path for the 486 machines, thereby extending the machine's life.



For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Publications, Transportation Technology Transfer Program, DOT&PF, 2301 Peger Road, M/S 2552, Fairbanks, AK 99709-5316. For more information, you can also call (907) 474-2484.

NEW PUBLICATIONS AVAILABLE FOR LOAN 1992

No. 26

Place a check by the publications you wish to borrow.

____ **Access Management for Streets and Highways**, ID-767, FHWA, FHWA-IP-82-3, June 1982, 221pp.

____ **American Association of State Highway and Transportation Officials Statements:**

ID-743A____ **Surface Transportation Reauthorization Legislation**, Washington D.C., March 13, 1990, 48pp.

ID-743B____ **Potential Impacts of Pending Clean Air Act Reauthorization Legislation**, Washington D.C., November 9, 1989, 11pp.

ID-743C____ **Shortfall In Highway Trust Fund Collections**, Washington D.C., October 26, 1989, 6pp.

____ **Asphalt Paving Inspection Manual**, ID-742, Alaska DOT&PF, May 1990, 178pp. By Mattew Reckard and John Ryer.

____ **Basic Operators Orientation Training (BOOT), Instructors Manual**, ID-747, Tennessee DOT, 1988, 25pp. BOOT is intended solely for use in training courses and may be shown in conjunction with such courses without limitation. Videotapeincluded.

____ **California's Recommendations For A Post-Interstate National Surface Transportation Program Executive Summary**, ID-744, Caltrans, March 1990, 7pp.

____ **Emergency Procedures for Rural Transit Drivers**, ID-769U, UMTA/RTAP Training National Program, International Support Services. Includes 2 audio tapes, 1 video tape, participants workbook and manager's handbook.

____ **Evaluation of a Hand Held Microcomputer as a Data Collection Device**, ID-741, USDOT/FHWA, FHWA-ME-89-1, June 1989, 30pp.

____ **The Forgiving Highway**, ID-758, USDOT/FHWA, FHWA-SA-90-012, HHS-21/4-90(20M)E, Office of Highway Safety, 1990, 9pp. Brochure.

____ **Highway Construct*Ability Guide**, ID-751, The Texas State Department of Highways and Public Transportation, July 1990, 24pp. Research Project 3-6-88-1149.

____ **Highway Safety Is No Accident**, ID-757, USDOT/FHWA, FHWA-SA-90-009, 1990. Brochure.

____ **Improving Local Conditions For Bicycling**, ID-746, Bikecentennial, Montana, 4pp.

____ **Institute for Transportation Research and Education Annual Report 1989**, ID-768, University of North Carolina, 14pp.

____ **Integrated Traffic Safety Management in Urban Areas**, ID-756, Road Transport Research, OECD, Paris 1990, 121pp.

____ **Local Government Agenda**, ID-760, Technology Resource Center, TEEX, Summer 1990, vol. 1, No. 4, 24pp.

____ **Maintenance of Aggregate and Earth Roads**, ID-753, FHWA/USDOT, June 1987, 78pp. FHWA-TS-90-035. This manual is a state-of-the-art document covering road maintenance planning, concepts, scheduling, equipment and materials selection, use of goals and objectives, and field procedures. Emphasis is on travel way, shoulders and roadside ditch maintenance activities.

____ **New Methods for Determining Requirements for Truck-Climbing Lanes**, ID-740, USDOT/FHWA, FHWA-IP-89-022, September 1989, 37pp.

____ **Oregon Bicycle - Motor Vehicle Accidents 1988**, ID-745, Oregon DOT - Highway Division, September 1989, 11pp.

____ **Practical Environmental Auditing Workshop**, ID-750, Alaska T2 Program and Arctic Trails Chapter 71 International Right of Way Association, Saturday, May 19, 1990.

____ **Private and Public Investment in Transport**, ID-754, Economic Research Centre, Round Table 81, European Conference of Ministers of Transport, Paris 1990, 109pp.

____ **Proceedings of the Workshop on Resilient Modulus Testing: State of the Practice**, ID-748, Oregon State University, FHWA/DOT, March 28-30, 1989, 300pp.

____ **Reconnecting Rural America: Recommendations for a National Strategy**, ID-763, USDA/OT, Omaha, Nebraska, September 1989, 51pp.

____ **Road Monitoring for Maintenance Management**, ID-755, Road Transport Research, OECD World Bank, Paris 1990. Volume I: Manual for Developing countries, 113pp. Volume II: Damage catalogue for Developing Countries, 91pp.

____ **Rural Bridges: An Assessment Based Upon the National Bridge Inventory**, ID-762, Transportation Report, U.S. Department of Agriculture, August 1989, 26pp.

____ **Rural Highway Finanace: Federal Funding for Interstate and Non-Interstate Highways in Rural Areas**, ID-773, by Nicholas Marathon and Jerry D. Norton, USDA/OT, September 1988, 20pp. Transportation facts.

____ **Rural Roads and Bridges: A Dilemma for Local Officials**, ID-764, USDA/OT, April 1989, 183pp.

____ **Safety in Construction and Maintenance Work Zones and Transportation of Hazardous Materials**, ID-752, Transportation Research Record 693, National Academy of Sciences, December 21, 1977, 51pp.

____ **STARTS: Driver Training Program**, ID-765U, UMTA/USDOT, July 1988. Includes Driver's Safety Manual, Administrator's Guide, Slides (50 on Vehicle Safety Inspection, 64 on Driver Sensitivity and Passenger Relations, and 126 on Defensive and Safe Driving Procedures, plus 3 audio cassettes that accompany the slides) and a video tape: STARTS Training Program (See ID-131U of the video library); topics include, Vehicle Inspection, Driving Safety, and Passenger Relations.

____ **Technical Data Sheet, Geotechnical Applications**, Dow *Styrofoam* Brand, 1990.
ID-761A____ **Soil Insulation**, 5.3.2
ID-761B____ **Lightweight Fill/Weight Credit**, 5.3.3
ID-761C____ **Buried Utility Line Insulation**, 5.3.4

____ **Timber Bridges Design, Construction, Inspection, and Maintenance**, ID-749, U.S. Department of Agriculture Forest Service, June 1990, 954pp. EM 7700-8.

____ **Turner-Fairbank Highway Research Center: Update**, ID-766, USDOT/FHWA, FHWA-RD-90-044, 16pp, June 1990.

____ **What Is A Service Area?**, ID-759, Fairbanks North Star Borough, Rural Service Office, 1990. Brochure.

These publications may be borrowed for three weeks. If you wish to receive a copy of any of the above publications, please contact **Susan Earp** at the Alaska Transportation Technology Transfer Program at **(907) 474-2484** for availability.

Please print your name and address below, and mail to:

Alaska Transportation Technology Transfer Program
Department of Transportation and Public Facilities
2301 Peger Road M/S 2552
Fairbanks, AK 99709-5361

Name:_____ **Title:**_____ **M/S:**_____
Organization:_____
Address:_____
City:_____ **State:**_____ **Zip:**_____ **Phone:**_____

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Publications, Transportation Technology Transfer Program, DOT&PF, 2301 Peger Road, M/S 2552, Fairbanks, AK 99709-5316. For more information, you can also call (907) 474-2484.

NEW VIDEOS AVAILABLE FOR LOAN 1992

No. 26

Place a check by the videos you wish to borrow.

____ **Crime Prevention Tool Management**, ID-203, 20min.

____ **Design of Urban Streets - Part IV**, ID-213, Ohio State University. Includes social and economic impacts, environmental considerations, project documentation, and administration and management.

____ **Distributor: Preventive Maintenance and Operations**, ID-201, New Mexico State Highway, 1985, Department Training Academy, 36min. Maintenance and operations of a 600 gallon tank, propane heated distributor. Procedures for care and proper operation including heating, hook-up, adjusting, shooting and cleaning.

____ **Ditchmaster Model 200**, ID-200, 10min. Promotional tape.

____ **Equipment Maintenance - Programming and Scheduling**, ID-216, Montana STate University, 55 mins. Poor tape quality. Discusses components for a successful maintenance schedule and how to implement the program.

____ **Functions of Lubrications: That Engines May Live**, ID-199, 10min. Discusses the importance of drainage to perform lubrication, cooling, sealing and scavenging. Copies from 16mm film, grainy and jumpy.

____ **Down Is Up**, ID-214, Caterpillar, 30 mins. Causes and effects of down time.

____ **Effective Snow Fences**, ID-208, SHRP, 20:42.
Part I - Benefits of Snow Fences, 10 min, for Chief Administrative Officers
Part II - Key Elements of Snow Fences, 11 min, for Technical/Operational Staff

____ **Pavement and Asphalt Techniques**, ID-215, Ohio State T2, 55 mins. Presentation by Asphalt Institute on pavement and asphalt construction. Includes materials preparation, placement, and characteristics of a well maintained road.

____ **Plow Operation**, ID-211, Part two, Utah, 10 min.

____ **Idea Store: Edition VI**, ID-198, PENN DOT, 1991, 17min. Highway vegetation, Adopt-A-Highway Program, proper signs and maintenance, brain storming box, locked cage hazard lights, precast panelized walls to prevent erosion, safety program in Kissimmee, Florida, Pennsylvania DOT's Road Scholar Program and submitting your ideas to the Idea Store.

____ **Quest for Excellence**, ID-202, Caterpillar, 30min. Caterpillar's technical center for research and development. Copied from 16mm film, grainy.

____ **Recycling Procedures**, ID-217, Montana State University, 39 min. Call for summary.

____ **Rehabilitation Options and Cost Analysis**, ID-204, 30min. Class room lecture.

____ **Rehabilitation Options and Cost Analysis**, ID-220, Montana State University, Asphalt Institute. 20 mins. Looks at four different tyupes of rehabilitation of pavements and roads and their costs.

____ **SHRP Now Exhibit 1990 AASHTO Technology Transfer Fair**, ID-207, 58:40. Includes the following topics: 1) Worker Safety, 2) Snow and Ice Control, 3) Highway Maintenance, 4) Concrete, 5) Asphalt, 6) LTPP, and 7) for more information.

____ **Signals: Read Them Or Weep**, ID-218, Caterpillar, 20 min. This film consists of re-created actual incidents. Signals that warned were present but were ingnored. Shows the consequences of ignored signals.

____ **Snow Plowing and Sanding**, ID-205, Oregon DOT, Portland State University, 19:34. Discusses safety and operation precautions to take before and during snow removal. Mounting blades and sanders.

____ **The Snowfighters**, ID-221, Salt Institute, 24 mins. Techniques and procedures for providing safe and efficient snow plowing programs without effecting the transportation system. Covers inspection of equipment, how to calculate salt dispensing, salt storage, maintenance before, during and after snow plowing, and planning.

____ **Snowfighters' Rodeo,** ID-219, Minnesota, 15 min. Snowfighters' rodeo was developed by the Virginia DOT based on APWA's snowplowing competition in Illinois. Event is used to prepare snowfighters' for the on coming winter months of snow removal by developing maitnenance personnels skills, show their talents, share ideas between districts and promotesafety.

____ **Snowfighting from A to Z,** ID-209, Salt Institute, 73 min. Includes 3 videotape sessions on the use of salt for deicing.

____ **Snowplows and Spreader Operation,** ID-206, 48min. Part I - 16min, Part II - 13min, and Part III - 19min.

____ **Straight Blade Snow Plows,** ID-210, Part one, Utah, 9:30 min.

____ **Traffic Signal Systems: Go For The Green, Part II,** ID-221, FHWA/USDOT, 14:51 mins. Time-based coordination in use for urban traffic control systems.

____ **Vegetation Management,** ID-213, Washington DOT, two parts.

These videos may be borrowed for three weeks. If you wish to receive a copy of any of the above videos, please contact **Susan Earp** at the Alaska Transportation Technology Transfer Program at **(907) 474-2484** for availability.

Please print your name and address below, and mail to:

Alaska Transportation Technology Transfer Program
Department of Transportation and Public Facilities
2301 Peger Road M/S 2552
Fairbanks, AK 99709-5316

Name:_____ **Title:**_____ **M/S:**_____
Organization:_____
Address:_____
City:_____ **State:**_____ **Zip:**_____ **Phone:**_____

For More Information

For back issues of our newsletter and inserts, or to get on our mailing list, write: Publications, Transportation Technology Transfer Program, DOT&PF, 2301 Peger Road, M/S 2552, Fairbanks, AK 99709-5316. For more information, you can also call (907) 474-2484.

Don't Get Hit When You Walk/Jog/Bicycle

People who get hit by cars while exercising tend to make these four mistakes:

- They walk or jog on busy streets when it's dark.

Solution: avoid these areas after dark. If you can't, **always** wear reflective clothing. Sporting goods stores sell reflective bibs, stripes, and bars. Bicyclists should have battery-operated head and tail lights on their bicycles in addition to using reflectivity.

- They walk or jog side-by-side with a partner on the street shoulder.

Solution: Jog and bike single file. Maybe you can't talk as easily, but you can avoid a trip to the hospital.

- They walk or jog on streets in the same direction as the traffic flow, rather than against traffic.

Solution: Rule of the road for all pedestrians: **always** face oncoming traffic. At least you have a chance to get out of the way if you notice that a vehicle is being driven erratically or seems to be coming straight for you. Bicyclists must obey the same traffic rules as vehicle operators.

- They don't look for cars when crossing streets.

Solution: Always look for cars before crossing.

Final notes:

* Avoid wearing headsets or earphones. Your ears are the early warning system that alert you to danger. Even though music is nice, you're much better off being able to hear what's going on around you. Remember, your body is far more vulnerable than a car.

* If you walk/jog/bicycle during the day, wear bright clothing so you don't blend into your surroundings. Grey, olive, navy and other similar muted colors blend too well with pavement and greenery. Go neon - or something equally vivid - so the driver of a vehicle can see you. Your 100 to 200 plus pound weight can't compete with a ton or more of metal and fiberglass.

Have fun, be safe.

Reprinted from Utah T2 Center March 1992, Volume 5, Number 1 newsletter issue and adapted by an Alaska T2 Program jogger. ♦

Avoiding Hazardous Substances During Field Drilling Operations

Every now and then, field drillers and geologists who are charged with being the first people on a highway route location will find themselves dealing with hazardous substances, whether they drill into it or have a crankcase break. With the increasing tougher laws and liabilities associated with hazardous substances, drillers and geologists need to be aware of the dangers associated with hazardous materials and how to avoid hazardous waste sites.

The Alaska T2 Program provided very successful training recently in both Fairbanks and Anchorage which addressed just those needs. Mike Travis, a former DOT&PF Statewide Research employee who was a co-developer of the two-day Alaska T2 Course, "Environmental Auditing for Transportation Officials," revamped that course to meet drillers' and geologists' needs. Workers in Fairbanks and Anchorage experienced a morning in the classroom and an afternoon in the field with a hands-on demonstration of how to properly decontaminate a drill rig.

Workers received an overview of state and federal hazardous waste laws, learned what entities to contact to obtain title history and past land uses, as well as what agencies to coordinate with, how to use the Alaska Department of Environmental Conservation database, and how to perform a site examination. Decontaminating the drill rig included procedures and storage of fluids, followed by the field demonstration.

Comments from the attendees: "Good course." "Great course." "Very good instructor/student inter-

action. Covered all questions from practical application to experience." "Enjoyed the presentation. Found it interesting and information."

If you want more information about the course, contact the Alaska T2 Program at (907) 474-2484. ♦

MichaelTravis,Instructor

WorkyardDemonstration

Metric Conversion Performed By Computer

In our December 1991 issue we discussed the Federal Government's conversion to the metric system. This conversion is mandatory for all federal agencies, including the Federal Highway Administration.

While you may not feel this will impact your local agency, consider that all projects eligible for federal-aid will have to be designed using the metric system (or at least utilize conversions for the first years).

Now, the McTrans Center for Microcomputers in Transportation has a software program available that can automatically convert over 6,250 engineering units into metric units.

The program, called YUKON!, can convert length, area, volume, velocity time, angles, and density figures into metric units.

YUKON! also allows you to create customized unit-conversion files, and has dozens of other features. The program costs only $30, plus a $5 processing fee per order.

To order YUKON!, or to get more information about YUKON! and other programs available from McTrans, please contact:

McTrans Center
University of Florida
512 Weil Hall
Gainesville, FL 32611
(904) 392-0378

Reprinted from Indiana T2 Center Volume 10, Number 2 of HERPICC Pothole Gazette. ♦

ATTENTION

Arriving this fall . . .

A Low-Volume Roads Manual prepared by the American Socicty of Civil Engincers is being published by the Federal Highway Administration and will be available through T2 Centers nationwide. Your Alaska T2 Program will receive this manual– watch for an announcement late this year.

The manual has five chapters that are about thirty pages each:

- Planning Process for Low-Volume Streets and Roads
- Construction and Maintenance
- Traffic Safety and Design
- Road Surface Management
- Geometric Design

The information is written in a format that nonengineers can easily understand, and that engineers should find very user-friendly. A group of engineers, foremen, public works directors, road supervisors and commissioners, and elected officials who were able to interact with the authors recently critiqued the draft manual at a national seminar. The result is what's getting published.

Call the T2 Office at (907) 474-2484 to reserve your copy. ♦

HOW ADA AFFECTS PUBLIC EMPLOYERS

Reprinted from the February 1992 Vol. 107, No. 2 issue of "American City & County," with permission from Nicole Acts of Communication Channels, Inc.

The Americans With Disabilities Act (ADA) will dramatically affect public employers' practices. But many of the central requirements have only partially-defined compliance guidelines, the parameters of which the federal government anticipates will be fleshed out on a per-case basis.

The ADA protects qualified individuals with disabilities who, with or without accommodation, are able to perform the essential functions of a job. To be considered disabled under ADA, an individual must have a physical or mental impairment which substantially limits a major life function such as working. Current drug users are not protected, although those enrolled in, or who have completed, a rehabilitation program are considered disabled under the ADA.

The legislation requires employers to reasonably accommodate the known disabilities of employees and applicants who are able to perform essential job functions. The employer's decision as to what constitutes essential job functions will not necessarily be considered valid by the ADA unless it is embodied in a written job description or advertisement.

Reasonable accommodation is another concept that has not yet been fully defined. Examples given by ADA include modifying work facilities to make them accessible, job restructuring, modifying equipment, adjusting tests and training sessions, and, if necessary, providing qualified readers and interpreters. Legislative history suggests that providing a business trip travel guide for a blind employee or a page turner to an employee without arms are reasonable accommodations.

An employer is not required to make accommodations that would cause an "undue hardship" to other organizations. The accommodation's cost versus the financial resources of the employer, the effect on expenses and resources, and the effect on other employees' abilities to perform their duties and the facility's ability to conduct business, will all be considered.

Additionally, employers cannot discriminate against disabled people with respect to providing benefits. However, the ADA does not invalidate preexisting health insurance benefit clauses or limit an employers' right to offer insurance which limits coverage for certain treatments or procedures to a specified number each year. As long as they are not subterfuges to evade the ADA's purposes, the law permits the development and administration of benefit plans in accordance with accepted principles of risk management.

The ADA also requires modification of standard pre-employment practices. It will be illegal for an employer to ask an applicant if he or she has a disability or to inquire about the nature and extent of that condition. Similarly, questions concerning prior worker's compensation history will be illegal.

This article was written by Howard Flaxman, a partner with Blank, Rome, Comisky & McCauley law firm, Philadelphia. ♦

Position Search Announced

Mr. J. Fred O'Brien is retiring on September 30, 1992, after twenty-five years of outstanding service at Auburn University's Engineering Extension Service. Mr. O'Brien is responsible for the Alabama counterpart to the Alaska T2 Program. His leadership and astute counsel will be missed by T2 Programs nationwide.

The College of Engineering at Auburn University in Montgomery, Alabama invites applications and nominations for the position of Director, Engineering Extension Service. The Engineering Extension Service develops, markets and conducts non-degree continuing education and service programs for a wide variety of clients including private industry, state and municipal governments, and federal agencies. Programs offered include short courses, seminars, workshops and regional, national and international conferences. The unit served over 4600 participants in 128 programs during the 1990-91 academic year with a total fiscal operation exceeding $1.8 million.

Candidates should possess the following qualifications:

- an earned doctorate or Master's degree in engineering or a related discipline appropriate for the administration of a growing continuing engineering education unit
- successful experience in continuing education
- leadership, communication and interpersonal skills, as evidenced by successful prior administrative experience
- experience in industry (desirable but not a requirement)

Send nominations or applications to: Dr. Joseph S. Boland, III, Associate Dean of Engineering, 202 Ramsay Hall, Auburn University, AL 36849. Application review begins June 15 and continues until the position is filled. The targeted date is September 1, 1992. ♦

FHWA Encourages Experimental Use of Safety Devices

New York and Illinois have been authorized by the Federal Highway Adminstration (FHWA) to begin experimentation on the Flashing Stop/Slow Paddle and the Opposing Traffic Lane Dividers, two innovative worker safety devices developed by SHRP. FHWA is encouraging other states to test the devices and will furnish the equipment for testing and fund the evaluations.

Other devices ready for testing include:

- Portable Sign and Stand
- Portable Speed Bump
- Diverging Lights
- Snow Plow Blade Markers

The recently formed FHWA/SHRP Implementation Coordination Group is working on a comprehensive plan to assure the prompt transfer of the devices into practice.

Reprinted from SHRP's "Focus," March 1992 issue. ♦

SUBSURFACE UTILITY ENGINEERING

A test project was conducted in October by the Missouri Highway and Transportation Department and So-Deep, Inc. utilizing subsurface utility engineering (S.U.E.) in the St. Louis Area. S.U.E. is a new technology used to determine the precise location of existing underground utilities. The technology includes electronic equipment to designate utilities and dig test holes to verify the utility size and depth. The test holes are dug by non-destructive methods such as compressed air and vacuum systems. Designers can use the information to identify conflicts early in the development of the project. This should result in lower project costs and reduced construction time.

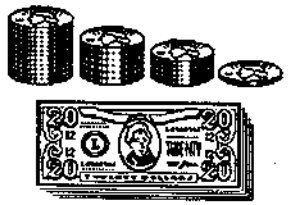
In our test project, two unknown utilities were located that were not shown on utility company drawings. We also discovered the actual buried utilities were not at the same locations shown on utility company records.

With this underground information, it was possible to make some design changes to our storm drainage to miss existing water mains. This will avoid a timely and costly relocation of water mains and the roadway contractor will be spared a delay in the project.

We plan to try this technology on a larger project in the early design phase so that we can fully evaluate its usefulness and cost effectiveness. We believe it may be a useful service, especially in the urban area where numerous underground utilities exist.

A number of companies located on the east coast offer the service known as subsurface utility engineering.

Reprinted from Missouri's T2 newsletter, "Missouri Transportation Bulletin," Vol. 8, No. 4, Winter 1991-92. ♦



Creatively Using Existing Technology

Last year's spring breakup turned the Kenai Spur Highway into a navigable waterway, slowing traffic to a crawl. With the snow melting above ground, the underground culverts remained frozen. The water dammed up into traffic-snarling lakes instead of flowing into the Kenai River. To prevent a reccurrence of this problem, DOT&PF planned to run thousands of feet of heating wire through the culverts. When activated, the wire would melt the ice in the pipes, allowing the water to drain into the river.

This project presented an unusual problem, however. Some of the drainage pipe was large enough for a person to crawl through. But some 1750 feet of pipe was only 18 inches wide, too small for even a small person to pass through. In addition, debris partially blocked some pipes, and would prove impassible even to a remote control car.

The contractor in charge of the project came up with a creative solution to the dilemma - he "hired" Micah, a 10-year old, 16 inch Schipperke. The dog, from Citadel K-9 Kennels in Nikiski, was lowered down the manhole on one side of the culvert with a harness strapped around her, wire trailing behind. Five hundred feet away, at the other end of the culvert, Micah's owner called to her. "All you could see was the two little glowing eyes and feet going chick-a-chick-a-chick," said Cathy Harmon, the dog's owner and friend. Micah successfully navigated through three more sections of dark, cramped culvert, dragging the heating wires through the small passageways to successfully complete the project.

Reprinted from "Intransit", State of Alaska DOT&PF, Vol 132, No 1, January 1992. ♦

ALASKA TRANSPORTATION
TECHNOLOGY TRANSFER

1992 T2 CALENDAR OF EVENTS

MAY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

May 18-21: Systematic Development of Informed Consent, Anchorage, (907) 474-2484.

June 15-17: OECD Workshop on Knowledge-Based Expert Systems in Transportation, Montreal, Quebec, Canada.

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

See below for locations.

JULY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

July 12-15: Institute of Transportation Engineers Conference, Anchorage, Sheraton Hotel. Registration: (907) 343-4251.

August 2-5: 1992 RTAP Annual Meeting, Lexington, KY. Contact Terri at (606) 257-4531 for information.

AUGUST

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Meetings Around Alaska

Alaska Society of Civil Engineers - *Anchorage:* Monthly, 3rd Tues., noon, Northern Lights Inn. *Fairbanks:* Monthly, 3rd Fri., noon, Captain Bartlett Inn. *Juneau:* Monthly, except June - August, 2nd Wed., noon, Breakwater Inn.

Alaska Society of Professional Engineers - *Fairbanks:* Monthly, 1st Fri., noon, Captain Bartlett Inn.

Alaska Society of Professional Land Surveyors - *Anchorage:* Monthly, 3rd Tues., noon, Executive Cafeteria Federal Building. *Fairbanks:* Monthly, 4th Tues., noon, Sunset Inn.

Institute of Transportation Engineers - *Anchorage:* Monthly, 3rd Thur., Elmers.

International Right of Way Association - *Anchorage:* Sourdough Chapter 49: Monthly, except July & December, 2nd Thur., noon, Anchorage International Inn. *Fairbanks*: Arctic Trails Chapter 71:Monthly, except December, 2nd Wed., noon, Sunset Inn. *Juneau:* Totem Chapter 59: Monthly, 1st Wed., noon, Mike's Place in Douglas.

American Public Works Association: May 21, noon, Anchorage International Inn, (907) 279-1122.

If you would like to publicize an event in our calendar, please contact us at (907)474-2484.

Who's Who in Alaska's Transportation Network

Alaska T2 is beginning to compile a list of Alaska transportation professionals, together with their area(s) of expertise and a contact telephone number. The following, our first step in the assimilation process, is a list of people with responsibility for transportation work in Boroughs, Cities and Municipalities. Please contact the T2 Office at (907) 474-2484 if you are interested in being listed. Provide your name, field(s) of expertise, and phone number. Department of Transportation and Public Facilities and University of Alaska Fairbanks professionals will be listed in a later issue. Private sector experts are also included.

Boroughs, Cities, and Municipalities

Victor Adames, Jr., Public Works Director, City of Kivalina

Floyd Ainsworth, Public Works Director, City of Seward

Herman Aishanna, Public Works Director, City of Kaktovik

Woodrow Anderson, Public Works Operator, City of Saxman

Robert Andrews, Public Works Director, City of Emmonak

John Ashenfelter, Public Works Director, City of Kake

Louis G. Beans, Public Works Director, City of St. Mary's

Jon Bendz, Engineer, City of Craig

Grafton Bergman, Public Works Director, City of Fort Yukon

Hugh Bevan, Public Works Director, City of Homer

Stephen Bonebrake, Engineer, City of Soldotna

Ken Brown, Public Works Director, Kenai Peninsula Borough

Richard Brown, Public Works Director, City of Klawock

David Bunnell, Public Works Director, City of Soldotna

Robert Caldwell, Public Works Director, City of Wrangell

Ray Camardella, Engineer, Kodiak Island Borough

Ken Canfield, Public Work Director, Municipality of Anchorage

Roy Carlson, Public Works Director, Matanuska-Susitna Borough

Jeff Currier, Public Works Director, City of Cordova

Paul Diener, Engineer, City of Seward

Raymond L. Dinger, Public Works Director, City of Delta Junction

Ross Dunfee, Engineer, Municipality of Anchorage

Rosie Edwin, Public Works Director, City of Huslia

Chuck Eggener, Engineer, City of Aniak

David Grant, Public Works Director, City of Hydaburg

Victor Gretzinger, Public Works Director, City of Palmer

Steve Hardin, Public Works Director, City of Dillingham

Dave Harman, Engineer, City and Borough of Juneau

Robert E. Harris, Public Works Director, City of Wasilla

George Hobson, Public Works Director, City of Nenana

Matthew C. Holmstrom, Engineer, City of Kodiak

Ben Hopson, Jr., Public Works/Utilities, City of Anaktuvuk Pass

David Jacoby, Public Works Director, City of Fairbanks

Michael James, Public Works Director, City of Sheldon Point

John Kameroff, Public Works Director, City of Alakanuk

George Keeney, Public Works Director, City of King Cove

Neil Kersten, Public Works Director, Fairbanks North Star Borough

Rich Koch, Engineer, North Slope Borough

Keith Kornelis, Public Works Director, City of Kenai

John LaBowe, Public Works Director, City of Whittier

Jack LaShot, Engineer, City of Kenai

Grant Lawson, Public Works Foreman, City of Skagway

Victor Lestenkof, Public Works Director, City of St. George

Eli Lucas, Public Works Director, City of Petersburg

Max Lyon, Transportation Director, Fairbanks North Star Borough

Dave Martin, Public Works Director, City of Bethel

George Martin, Public Works Director, City of Hoonah

Mike McKimens, Public Works Director, City of Craig

Louie Meacock, Public Works Director, City of Haines

Herbert E. Mitchell, Public Works Director, Bristol Bay Borough

Fred Monrean, Public Works Manager, City of Ketchikan

Jerry Moto, Public Works Director, City of Deering

Michael Okoniewski, Public Works Director, City of Pelican

Roosevelt Paneak, Public Works/Utilities, City of Anaktuvuk Pass

William Philo, Public Works Director, City of Houston

J.A. Pung, Engineer, City of Wrangell

Herman Reich, Public Works Director, City of Kotzebue

James Remitz, Public Works Director, City of North Pole

Ken Rydberg, Engineer, City of Fairbanks

Lee Schlitz, Public Works Director, City of Valdez

Allen Simeon, Public Works Director, City of Aniak

Steffan Strick, Public Works Foreman, City of McGrath

George Strother, Engineer, Matanuska-Susitna Borough

Roe Sturgulewski, Public Works Director, City of Unalaska

John E. Sullivan, Public Works Director, City of Kodiak

Tryck, Nyman & Hayes, Engineer, Bristol Bay Borough

Richard Tuluk, Public Works Director, City Chevak

Jose Vicente, Engineer, City of Homer

Jim Voetberg, Engineer, Ketchikan Gateway Borough

Ron Welch, Engineer, City of Petersburg

William Wilcox, Engineer, City of Valdez

Spiridon Zaochney, Public Works Director, City of Atka